WE CLAIM

1. A method of modifying material represented by information signals, comprising deriving digital representations of transform coefficients of the information signals, and modifying and entropy encoding said digital representations, wherein at least some of said digital representations are modified by making pseudo random changes to them in accordance with a substantially invertible algorithm, which changes do not substantially change the number of entropy encoded bits.

2. A method according to claim 1, wherein said modifications do not represent data.

3. A method according to claim 1, wherein said transform coefficients are quantised.

4. A method according to claim 1, wherein said changes are perceptible in the material.

5. A method according to claim 1, wherein a group of the said representations is pseudo randomly changed by determining whether one or more transpositions of the representations of the group exist which do not increase the number of entropy encoded bits and selecting the, or one of the, transposed groups or the untransposed group in accordance with the value of a pseudo random number.

6. A method according to claim 1, which comprises:
defining, for each representation, a set of representations of similar magnitude of which that representation is a member; and a member of a set to be modified is modified by pseudo randomly transposing that member with another member of the set in accordance with a predetermined transposition algorithm, thereby to modify the material without substantially changing the number of entropy encoded bits.

7. A method according to claim 6, wherein if a representation of value N1 is to be changed by an amount X, it is transposed with another member of value N2 of the set where $|N1-N2| = X$, and X is a pseudo random value selected according to the invertible algorithm.

8. A method according to claim 7, wherein a said set comprises members whose maximum and minimum values differ by about 2X.

9. A method according to claim 7, wherein X is dependent on a proportion P, where 0<=P<=1, of the value of a pseudo random number RN1 where the proportion P equals a value L/M where L represents a predetermined ,selected, level and M equals the maximum allowable value of L.

10. A method according to claim 9, wherein X is varied in dependence on a pseudo random number RN2.

11. A method according to claim 6, wherein a representation comprises a group code indicating the magnitude group of the representation, and an index code indicating the position of the representation in the group and the representation is transposed by replacing the index code of the representation by another index code in the same group and chosen pseudo randomly according to the invertible algorithm.

12. A method according to claim 1, wherein the deriving step comprises receiving digital representations of samples of the material, and applying a transform thereto to derive transform coefficients, and quantising the transform coefficients.

13. A method according to claim 1, wherein the deriving step comprises receiving an entropy encoded bitstream representing transform coefficients and extracting form the bitstream codes which represent the coefficients.

14. A method according to claim 1, comprising the step of selecting a part or parts of the material which is to be modified.

15. A method according to claim 14, comprising storing a bit map of the part or parts of the material which are to be modified and selecting a part or parts to be modified in accordance with the map.

16. A method according to claim 15, when directly or indirectly dependent on claim 9, wherein the bit map stores one or more values of the level L.

17. A method according to claim 16, wherein the bit map stores different values of L for different parts of the material.

18. A method according to claim 14, wherein the coefficients are grouped in blocks, the selecting step comprising selecting blocks of coefficients the representations of which are to be changed.

19. A method according to claim 18, wherein the blocks each comprise DC and AC coefficients and the selecting step selects AC coefficients for change in some blocks and DC coefficients for change in other blocks.

20. A method according to claim 19, wherein DC coefficients are modified differently to AC coefficients.

21. A method according to claim 1, wherein the said transform coefficients are DCT coefficients.

22. A computer program product providing computer executable instructions, which when loaded onto a data processor configures the data processor to operate according to the method of claim 1.

23. Apparatus arranged to carry out the method of claim 1.

24. A method of removing modifications applied to information signals representing material by the method of claim 1, comprising deriving entropy encoded digital representations of the transform coefficients, extracting codes representing the digital representations and applying the inverse of the invertible algorithm to the codes.

25. A method according to claim 24, wherein the said digital representations are quantised transform coefficients.

26. A method according to claim 24, of removing modifications applied to information signals representing material by the method of claim 5, the method comprising determining whether one or more transpositions of the representations of the group exist which do not increase the number of entropy encoded bits and selecting the, or one of the, transposed groups or the untransposed group in accordance with the value of a pseudo random number.

27. A method according to claim 26, wherein the pseudo random number is derived from a key.

28. A method according to claim 24, of removing modifications applied by the method of claim 6, comprising the steps of defining, for each modified representation, a set of representations of similar magnitude of which that representation is a member, and a member of a set to be restored to its unmodified value is changed by pseudo randomly transposing that member with another member of the set in accordance with the inverse of the said predetermined transposition algorithm.

29. A method according to claim 28 wherein if a representation of value N1 is to be changed by an amount X, it is transposed with another member of value N2 of the

set where |N1-N2| = X, and X is a pseudo random value selected according to the said inverse algorithm.

30. A method according to claim 29, wherein a said set comprises members whose maximum and minimum values differ by about 2X.

31. A method according to claim 29, wherein X is dependent on a proportion P, where 0<=P<=1, of the value of a pseudo random number RN1 where the proportion P equals a value L/M where L represents a predetermined, selected, level and M equals the maximum allowable value of L.

32. A method according to claim 31, wherein X is varied in dependence on a pseudo random number RN2.

33. A method according to claim 28, wherein a representation comprises a group code indicating the magnitude group of the representation, and an index code indicating the position of the representation in the group and the representation is transposed by replacing the index code of the representation by another index code in the same group and chosen pseudo randomly according to the inverse algorithm.

34. A method according to claim 24, comprising the step of determining for each representation whether it has been subject to modification by reference to data indicating the representations which have been modified and selecting for change those representations which were modified.

35. A method according to claim 34, wherein the said data is a bit map.

36. A method according to claim 35 when directly or on claim 31, wherein the bit map stores one or more values of L.

37. A method according to claim 36, wherein the bit map stores different values of L for different parts of the material.

38. A method according to claim 34, wherein the coefficients are grouped in blocks, the selecting step comprising selecting blocks of coefficients the representations of which are to be changed.

39. A method according to claim 38, wherein the blocks each comprise DC and AC coefficients and the selecting step selects AC coefficients for change in some blocks and DC coefficients for change in other blocks.

40. A method according to claim 39, wherein DC coefficients are changed differently to AC coefficients.

41. A method according to claim 26, wherein the said transform coefficients are DCT coefficients.

42. A method according to claim 24, comprising the step of downloading, from a data carrier, inverse change data required to remove the modification.

43. A computer program product providing computer executable instructions, which when loaded onto a data processor configures the data processor to operate according to the method of claim 24.

44. Apparatus arranged to operate in accordance with the method of claim 24.

45. Apparatus for modifying material represented by information signals, comprising a processor arrangement operable to derive digital representations of transform coefficients of the information signals and to modify and entropy encode the coefficients, wherein the processing arrangement is operable to modify the representations by making pseudo random changes to them in accordance with a substantially invertible algorithm, which changes do not substantially change the number of entropy encoded bits.

46. Apparatus according to claim 45, comprising a transform processor for deriving digital representations of transform coefficients derived from the digital information signals; and

a change processor for modifying, and entropy encoding, the said digital representations of the transform coefficients.

47. Apparatus according to claim 45, wherein the processing arrangement is operable to make changes which are perceptible in the material.

48. Apparatus according to claim 45, wherein the processing arrangement is operable such that a group of representations is pseudo randomly changed by determining whether one or more transpositions of the representations of the group exist which do not substantially change the number of entropy encoded bits and selecting the, or one of the, transposed groups or the untransposed group in accordance with the value of a pseudo random number.

49. Apparatus according to claim 45, wherein the processing arrangement is operable to define, for each representation, a set of representations of similar magnitude of which that representation is a member, and a member of a set to be modified is modified by pseudo randomly transposing that member with another member of the set in accordance with a predetermined transposition algorithm, thereby to modify the material without substantially changing the number of entropy encoded bits.

50. Apparatus according to claim 49 wherein if a representation of value N1 is to be changed by an amount X, it is transposed with another member of value N2 of the set where |N1-N2| = X, and X is a pseudo random value selected according to the invertible algorithm.

51. A method according to claim 50, wherein a said set comprises members whose maximum and minimum values differ by about 2X.

52. Apparatus according to claim 50, wherein X is dependent on a proportion P, where 0<=P<=1, of the value of a pseudo random number RN1 where the proportion P equals a value L/M where L represents a predetermined ,selected, level and M equals the maximum allowable value of L.

53. Apparatus according to claim 52, wherein X is varied in dependence on a pseudo random number RN2.

54. Apparatus according to claim 49, wherein a representation comprises a group code indicating the magnitude group of the representation, and an index code indicating the position of the representation in the group and the representation is transposed by replacing the index code of the representation by another index code in the same group and chosen pseudo randomly according to the invertible algorithm.

55. Apparatus according to claim 45, wherein the processing arrangement is operable to receive digital representations of samples of the material, and applying a transform thereto to derive transform coefficients, and quantise the transform coefficients.

56. Apparatus according to claim 45, wherein the processing arrangement is operable to a bit stream representing entropy encoded transform coefficients and to extract therefrom codes representing the coefficients.

57. Apparatus according to claim 45, wherein the processing arrangement is operable to select a part or parts of the material which is to be modified.

58. Apparatus according to claim 57, wherein the processing arrangement is operable to store a bit map of the portions of the material which are to be modified and select portions to be modified in accordance with the map.

59. Apparatus according to claim 58, when directly or indirectly dependent on claim 52, wherein the bit map stores one or more values of the level L.

60. Apparatus according to claim 59, wherein the bit map stores different values of L for different parts of the material.

61. Apparatus according to claim 57, wherein the processing arrangement groups coefficients in blocks, and selects blocks of coefficients the representations of which are to be changed.

62. Apparatus according to claim 61, wherein the blocks each comprise DC and AC coefficients and the change processor selects AC coefficients for change in some blocks and DC coefficients for change in other blocks.

63. Apparatus according to claim 62, wherein DC coefficients are modified differently to AC coefficients.

64. Apparatus according to claim 45, wherein the said processing arrangement is operable to produce DCT coefficients.

65. A computer program product providing computer executable instructions, which when loaded onto a data processor configures the data processor to operate as the apparatus of claim 45.

66. Apparatus for removing modifications applied to information signals representing material by the apparatus of claim 45, comprising a decoder for deriving a bit stream representing entropy encoded digital representations of the transform coefficients of the modified material, and for extracting from the bitstream codes representing the coefficients and an inverse change processor for applying the inverse of the invertible algorithm thereto.

67. Apparatus according to claim 66 for removing modifications applied to information signals representing material by the apparatus of claim 48, wherein the inverse change processor is operable to determine whether one or more transpositions

of the representations of the group exist which do not substantially change the number of entropy encoded bits and to select the, or one of the, transposed groups or the untransposed group in accordance with the value of a pseudo random number.

68. Apparatus according to claim 67, wherein the pseudo random number is derived from a key.

69. Apparatus according to claim 66 for removing modifications applied by the apparatus of claim 49, wherein the inverse change processor is operable to define, for each modified representation, a set of representations of similar magnitude of which that representation is a member, and a member of a set to be restored to its unmodified value is changed by pseudo randomly transposing that member with another member of the set in accordance with the inverse of the said predetermined transposition algorithm.

70. Apparatus according to claim 69 wherein if a representation of value N1 is to be changed by an amount X, it is transposed with another member of value N2 of the set where $|N1-N2| = X$, and X is a pseudo random value selected according to the said inverse algorithm.

71. Apparatus according to claim 70, wherein a said set comprises members whose maximum and minimum values differ by about 2X.

72. Apparatus according to claim 69, wherein X is dependent on a proportion P, where $0<=P<=1$, of the value of a pseudo random number RN1 where the proportion P equals a value L/M where L represents a predetermined, selected, level and M equals the maximum allowable value of L.

73. Apparatus according to claim 70, wherein X is varied in dependence on a pseudo random number RN2.

74. Apparatus according to claim 69, wherein a representation comprises a group code indicating the magnitude group of the representation, and an index code indicating the position of the representation in the group and the representation is transposed by replacing the index code of the representation by another index code in the same group and chosen pseudo randomly according to the inverse algorithm.

75. Apparatus according to claim 66, wherein the inverse change processor is operable to determine for each representation whether it has been subject to

modification by reference to data indicating the representations which have been modified and selecting for change those representations which were modified.

76. Apparatus according to claim 75, wherein the said data is a bit map.

77. Apparatus according to claim 76 when dependent on claim 72, wherein the bit map stores one or more values of L.

78. Apparatus according to claim 77, wherein the bit map stores different values of L for different parts of the material.

79. Apparatus according to claim 75, wherein the inverse change processor is operable to group the coefficients in blocks, and to select blocks of coefficients the representations of which are to be changed.

80. Apparatus according to claim 79, wherein the blocks each comprise DC and AC coefficients and the inverse change processor is operable to select AC coefficients for change in some blocks and DC coefficients for change in other blocks.

81. Apparatus according to claim 80, wherein DC coefficients are changed differently to AC coefficients.

82. Apparatus according to claim 66, wherein the said transform coefficients are DCT coefficients.

83. A data carrier storing a template defining locations in material which are to be modified, and other data required to apply the modification(s).

84. A data carrier storing a template defining locations in material which are to be modified, and other data required to remove the modification(s).

85. A carrier according to claim 83, wherein the said other data includes at least one security keys for generating a pseudo random number.

86. A carrier according to claim 85, wherein the said other data includes at least data relating to limits on the value of the pseudo random number.

87. A carrier according to claim 83, wherein the said other data includes data relating to the magnitude of the modification(s).

88. A camera/recorder including apparatus according to claim 45.

89. A system comprising apparatus according to claim 45, apparatus according to claim 66, and a data carrier according to claim 83.